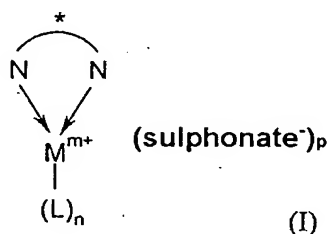


WHAT IS CLAIMED IS:

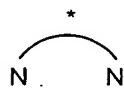
1. Substances comprising at least

- one micro-, meso- or macroporous support material and
- compounds, adsorbed thereon or therein, of the formula (I)



5

where



is an enantiomerically enriched chiral nitrogen compound,

 (M^{m+}) is a metal having valency m

L is an anionic or uncharged ligand

10 (sulphonate⁻) is the anion of a sulphonic acid and

p is one or two and

n is one, two, three or four,

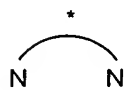
with the proviso that $m - p - [\text{number of anionic ligands}] = 0$.

15 2. Substances according to Claim 1, characterized in that the support materials have a pore size of 15 to 250 Å.

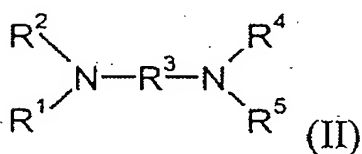
3. Substances according to Claim 1, characterized in that the support materials are silica gels or zeolites of the MOR, X, Y, MCM, ZSM, FAU,

MFI, L, BEA, FER, A and SBA, AlPO, MAIPO or SAPO type, and the zeolites are optionally isomorphically substituted.

4. Substances according to Claim 1, characterized in that, in formula (I),



is enantiomerically enriched chiral nitrogen compounds of the formula (II)



where

R^1 , R^2 , R^4 and R^5 are each independently hydrogen, C_1 - C_8 -alkyl, C_5 - C_{15} -arylalkyl, C_4 - C_{14} -aryl, or NR^1R^2 and/or NR^4R^5 as a whole is a cyclic amino radical having a total of 4 to 20 carbon atoms,

R^3 is a divalent radical having 2 to 30 carbon atoms or

R^3 and at least one of the radicals R^1 , R^2 , R^4 and R^5 together are part of a cyclic amino radical having a total of 4 to 20 carbon atoms.

5. Substances according to Claim 4, characterized in that

R^1 , R^2 , R^4 and R^5 are each independently hydrogen, C_1 - C_8 -alkyl, C_5 - C_{15} -arylalkyl or C_4 - C_{14} -aryl, or NR^1R^2 and/or NR^4R^5 as a whole is a 5- or 6-membered monocyclic amino radical which is optionally mono-, di-, tri- or tetrasubstituted on the carbon framework by C_1 - C_4 -alkyl and

R^3 is a divalent radical which is selected from the group of C_2 - C_8 -alkylene which may optionally be further mono- or diubstituted by C_4 - C_{14} -aryl radicals, C_5 - C_{15} -arylalkylene, C_4 - C_{14} -arylene or bis(C_4 - C_{14} -arylene) or

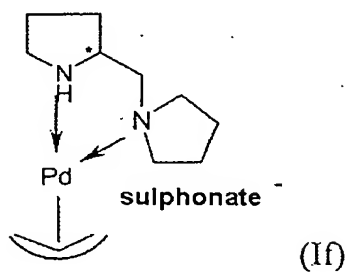
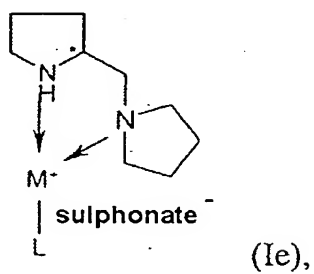
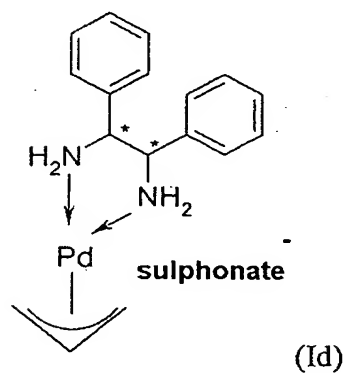
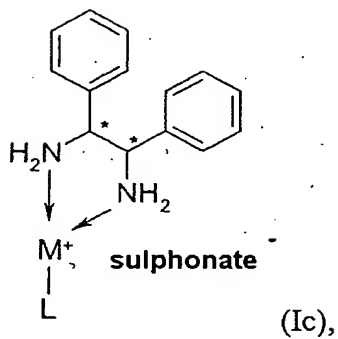
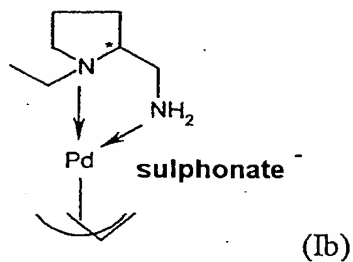
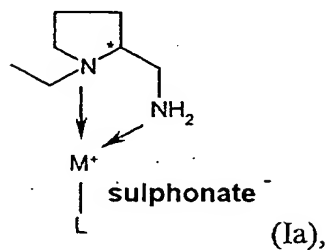
5 R^3 and one of the radicals R^1 , R^2 , R^4 and R^5 together are part of a 5- or 6-membered monocyclic amino radical which is optionally additionally mono-, di-, tri- or tetrasubstituted on the carbon framework by C_1 - C_4 -alkyl.

6. Substances according to Claim 1, characterized in that, in formula (I),
 10 (M^{m+}) is cobalt in the formal oxidation states 0, +2 and +3, rhodium and iridium in the formal oxidation states +1 and +3, nickel, palladium and platinum in the formal oxidation states 0 and +2 or ruthenium in the formal oxidation state +2.

7. Substances according to Claim 1, characterized in that, in formula (I),
 15 L is the following types of ligand: monoolefins, diolefins, nitriles, aromatics or anionic ligands.

8. Substances according to Claim 1, characterized in that
 (sulphonate⁻) is salts of the type $R_6SO_3^-$ where R^6 is C_1 - C_{12} -alkyl, C_1 - C_{20} -haloalkyl, C_4 - C_{14} -aryl or C_5 - C_{15} -arylalkyl.

9. Substances according to Claim 1, characterized in that compounds of the
 20 formula (I) are those of the formulae (Ia), (Ib), (Ic), (Id), (Ie) and (If)



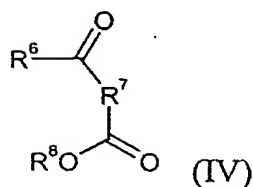
where, in each case,

* marks a stereogenic centre which is either R- or S-configured, with the proviso that mesoforms are excluded (compounds of the formula (Ic) and (Id))

- 5 M^+ is rhodium^I or iridium^I and
- L is cod or nbd and

sulphonate⁻ is trifluoromethanesulphonate, mesylate or nonafluorobutanesulphonate.

10. Compounds of the formula (I) as defined in Claim 1, with the exception of the following compounds:
 - 5 [Rh(cod)((S)-2-aminomethyl-1-ethylpyrrolidine)]OTf and [Rh(cod)((1R,2R)-1,2-diphenylethylenediamine)]OTf.
11. A process for conducting asymmetric reactions comprising catalyzing the reactions with substances according to Claim 1.
12. Catalysts comprising substances according to Claim 1.
- 10 13. Process for preparing enantiomerically enriched compounds comprising catalyzing the preparation with catalysts according to Claim 12.
14. Process according to Claim 13, characterized in that processes for catalytically preparing enantiomerically enriched compounds are asymmetric hydrogenations.
- 15 15. Process according to Claim 14, characterized in that asymmetric hydrogenations are hydrogenations of prochiral C=C bonds, C=O bonds and C=N bonds.
16. Process according to Claim 15, characterized in that hydrogenations of prochiral C=O bonds are hydrogenations of α - and β -keto carboxylic
20 esters.
17. Process according to Claim 16, characterized in that α - and β -keto carboxylic esters are those of the formula (IV)



where

R^6 and R^8 are each independently C_1 - C_{12} -alkyl, C_1 - C_{12} -haloalkyl C_5 - C_{15} -arylalkyl or C_4 - C_{14} -aryl and

5 R^7 is absent or is 1,1-(C_1 - C_4 -alkylene).

18. Process according to Claim 14, characterized in that the reaction temperature for asymmetric hydrogenations is 0 to 200°C and the partial hydrogen pressure is 0.1 to 200 bar.

10 19. Process according to Claim 14, characterized in that the asymmetric hydrogenations is conducted in the presence of solvents which are aliphatic or aromatic, optionally halogenated, hydrocarbons, ethers and/or alcohols.

20. Process according to Claim 13, characterized in that the weight ratio of catalysts according to Claim 1 to substrate is 1:1 to 1:10 000.